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The EXTENSION ENTOMOLOGIST

The Extension Entomologist endeavors to be of service to you as extension entomologists--to keep you informed of the work of one another in a common field. In this publication your various activities have been outlined, topics of interest in subject-matter and educational features have been included, changes in personnel have been mentioned, and a bibliography of current entomology literature has been included.

However, there is always room for improvement, and your suggestions as to how this publication might be made more useful would be appreciated. What do you like best in it? What do you like least? What added features would you like to see? We should like any and all comments. My aim is to make this publication more helpful to you.

M. P. Jones
Extension Entomologist

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE AND
EXTENSION SERVICE, COOPERATING

CONTENTS

ANNOUNCEMENTS

1939:

November 16 and 17. - Eastern Branch Meeting, New York City - Hotel New Yorker.

December 1 and 2. - Cumberland-Shenandoah Fruit Conference, College Park, Md.

December 27-30. - American Association of Economic Entomologists of the American Association for the Advancement of Science, Columbus, Ohio - Deshler-Wallick Hotel.

The Rocky Mountain Conference of Entomologists was held August 13 to 17. The main feature was a discussion of forest insects and their control. However, papers on other subjects were presented also. A copy of the report of this meeting can be obtained from Doctor G. M. List, Colorado State College of Agriculture, Fort Collins, as long as the supply lasts.

PERSONNEL

Arizona. - Dr. H. G. Johnston became extension entomologist on July 16, 1939. His address is Box 751, Phoenix, Ariz.

Dr. Johnston is a native of Mississippi, received his B. S. degree at Mississippi State College in 1926. Both his M. S. degree, in 1928, and his Ph. D., in 1936, were received at Iowa State College, Ames.

In October 1927, he was appointed assistant professor of entomology, Texas A. & M. College, a position which he held until his recent appointment as extension entomologist. In addition to teaching, he has served as field assistant with the Iowa State Department of Agriculture, Texas Agricultural Experiment Station, Mississippi State Plant Board, and with the Federal Bureau of Entomology and Plant Quarantine on several occasions.

His primary taxonomic interest is in the family Miridae, although his work has dealt with various groups of hemipterous insects.

In his present position he will devote half time to Extension and half time to research.

EXCERPTS FROM ARTICLES

Advertising Evaluation

(The following excerpt from an article by Harry H. Gould in the January 1939 issue of Advertising and Selling are reproduced here because of the application they have to extension teaching.--Editor).

"The major functions of an effective advertisement may be classified under the following five broad headings.

1. The first of these functions is that of securing reader attention in competition with the other advertisements and editorial matter on its page and other pages of the publication in which it appears. An effective advertisement must have Attention Value.

2. It is equally essential to effectiveness that the advertisement give up to the reader clearly, readily, and accurately the exact meaning which the advertiser wishes to convey. Meaning Value may therefore be designated as a second functional value.

3. The effective advertisement must accomplish both above functions in such a way as to predispose the reader favorably toward the product or the idea that the advertiser is trying to sell. It must create a warm or pleasantly favorable positive attitude on the part of the reader, rather than to leave him emotionally neutral or cold. This third essential functional value may be called Feeling Value.

4. Effectiveness, furthermore, requires that an advertisement make a sufficiently strong impression on the mind of the reader to insure its being retained until an opportunity is afforded or the proper time has arrived for the reader to respond to the suggestion it contains. It must have Memory Value.

5. Even though an advertisement performs all of the above four functions well, it still is not completely effective unless it induces in the reader a definite impulse to act on the suggestions contained in it. The advertisement must have Action Value."

County Agent Aid Increases

Any notion that American farmers fell into an unprogressive rut during the depression is dispelled by the announcement of the results of personal interviews with 32,000 farmers in 35 States. These results disclose that farmers are now more eager to learn and to use the latest scientific farming methods than they were in the boom days of 1928. This year, more than 53 percent of the farmers attended meetings or demonstrations held by their county agents, and more than 28 percent made the long drive to their State experiment station's farm and fields for up-to-date pointers on advanced farming, it was announced by the National Fertilizer

Association which conducted the Nation-wide poll. This mass pilgrimage to centers of agricultural information represents a gain of 16 percent in the number of farmers who reported that they attended county agents' meetings and demonstrations, over a similar survey made by the association 10 years ago. (Summarized from information appearing in the press.)

Vote of Confidence in County Extension Agents

The April number of Successful Farming contains a survey on county extension agents, one of a series - The Farmer Speaks, reflecting national opinion of farm men and women.

The men's opinions are: "A substantial vote of confidence in their county agent is registered by farm men* * *. Over three-fourths of the farmers throughout the Nation are 'acquainted' with their county agent; and among each 100 who know him, 44 say he's helped them 'a great deal,' 39 'a little,' and only 17 'not at all.' * * *. The county agent gets his greatest acclaim from the well-to-do farmers, half of whom vote he helps them a 'great deal.' The younger farmers give the county agent a slightly warmer reception than those who are over 50 years of age. But half of those who believe their county agent has been of no help admit they have never requested his help, and only a minority believe their methods superior * * *."

The women's opinions are: "While only half the farm women are familiar with their county home demonstration agents,the agents receive an even greater vote of confidence from farm women than county agents receive from farm men * * *. Fifty-five out of each 100 farm women who know their home demonstration agents say, 'They have helped a great deal.' The 32 who say 'a little,' and the 13 who say 'not at all,' put the blame on themselves, not their home demonstration agents * * *. Why are only half of the farm women acquainted with the home demonstration agents in their counties? Because 'it's too far to go,' says a Geneva County, Ala., farm woman. 'I can't take the children to the meetings' is the reason advanced by a Davis County, Iowa, woman. Give farm women more time and better transportation, and home demonstration agents can expect to find their meetings crowded to capacity * * *."

Summary of Results - Insect Control

The following statistical results of cooperative extension work in 1938 show the number of farmers following insect-control practices as reported by county agents. This probably represents only a portion of the farmers actually applying some form of insect control, but it does give an idea of the distribution of these control practices for protection of the various crops.

Crops on which control recommendations are applied	Farmers following insect-control recommendations
Corn	229,356
Wheat	261,058
Oats	103,464
Rye	26,743
Barley	61,984
Other cereals	44,744
Alfalfa	93,627
Sweetclover	27,410
Other clovers	19,885
Vetch	7,379
Lespedeza	7,140
Pastures	47,982
Soybeans	10,009
Cowpeas and field peas	11,437
Velvetbeans	720
Field beans	9,502
Peanuts	2,298
Other legumes and forage crops	14,269
Irish potatoes	184,140
Sweetpotatoes	16,169
Cotton	223,527
Tobacco	99,227
Other special crops	19,722
Home gardens	380,009
Truck crops	75,516
Tree fruits	100,574
Bush and small fruits	26,188
Grapes	13,939

General Feeder Insects

Farmers following recommendations	623,527
Pounds of poison used	284,318,740
Total estimated saving due to control program	$116,109,516

Texas Ranchmen Interested in Cattle-Grub Control

During the winter of 1937-38, 265 Hereford cattle on a 32,000-acre ranch in King County, Tex., were treated with a cube-powder wash to determine the feasibility of using this treatment for the control of cattle grub on range animals. The insecticide consisted of 1 pound of cube powder (90 percent 250-mesh to 4 percent rotenone) in suspension in 1 gallon of water containing approximately 4 ounces of home-made lye soap. The wash was thoroughly applied to the backs of the animals by rubbing it into the hair with a stiff fiber brush. About 8 ounces of the wash were used for each animal, and it was possible for 4 men to handle and treat 100 animals

an hour. The treated animals were segregated in a 10-section pasture surrounded by other pastures comprising some 227,000 acres, and on which were run a proportionate number of untreated cattle.

A check on the degree of infestation in treated and untreated animals during the fall of 1938, after the animals were exposed during one heel-fly season after the application of the treatment, showed an average of only 1.06 grubs a head in the treated animals; whereas, an average of 7.08 grubs a head were found in untreated animals running in adjoining pastures. Among untreated calves born after the adults were treated but before or during the heel-fly season and allowed to run on the same pasture as the treated animals, there was an average of 4.11 grubs per head. Calves born at approximately the same time but run on the pasture with the untreated adults were infested with an average of 12.4 grubs a head. The apparent great reduction of cattle-grub infestation as shown by this test has encouraged the owner of the ranch to treat all his cattle during the coming winter.

Owners of neighboring ranches were interested in the results obtained, and indicated that they would begin treatments of their cattle this season.

R. R. Reppert, Texas State extension entomologist, and H. T. Hackney, county agent, King County, initiated the tests and E. W. Laake, of the Bureau's Dallas, Tex., laboratory, cooperated in the checking of results.

EXCERPTS FROM ANNUAL REPORTS

Area Planning and Agricultural Conservation Programs

County-planning studies have not been used in all phases of the entomology project, but the areas as designated in the type-of-farming plan do coincide with the life zones of several important species of insects. Whether or not the county planning board will use the information will depend on what they may believe to be important.

The planning board has indicated that barley should replace corn and kafir in the areas where chinch bugs often become abundant. That will not be good planning, for other crops, which are not subject to chinch-bug injury, may be used. The use of legumes in all the planning is of much importance to the entomology project on account of the cutworm attack on that kind of crop. Where legumes are to replace wheat, corn, or other grain crops, the cutworm problem is sure to come up. That was well indicated during the spring of 1937.

The Agricultural Conservation Program considered the grasshoppers in their fall planting program. They urged that every farmer should plant alfalfa and keep the grasshoppers off. They also urged that everyone plant

wheat regardless of whether or not the grasshoppers were plentiful. That was a very good plan in 1936 and worked well. The suggestion did not work so well in 1937, for, as soon as the alfalfa and wheat came up, the grasshoppers were after it. The farmers were urged to wait as late as possible to plant wheat on account of the grasshoppers.

The summer fallow was an important phase of the program in the control of the pale western cutworm and the false wireworm. There were 6,500,000 acres of fallow land in the State, according to the executive secretary of the State Agricultural Conservation Committee, for wheat and alfalfa and that land was very free of grasshoppers, pale western cutworms, and false wireworms.

--Annual Report, 1937, Kansas
Extension Entomologist.

Local Organizations for Insect Control

During the past few years, weather conditions have favored certain species of insects, and they have built up in numbers and caused widespread crop losses. In early 1938, a State council on insect control was organized, and a State-wide organization composed of township leaders was selected in each county. Governor Lloyd Stark was interested in the work and sent out a letter naming each of the leaders, enlisting their support, and urging their cooperation. There were 1,300 in the 114 counties in the State. The primary purpose of this group was to assist in the local organization of farm people in the State to protect Missouri agriculture against insect damage. Grasshopper-control work during the year 1938 was the most important problem, but the organization as set up was not confined in its scope to any one insect. Leaders in several counties assisted with other insect-control projects.

The county agricultural agent was the leader of all the work in his county. Through this organization, county-wide interest was aroused, and large numbers of farmers were made aware of the large numbers of grasshopper eggs in the soil and the potential threat to 1938 crops. If no such complete organization had been in existence in the State, many more thousands of acres of crops, gardens, and the like, would have been seriously damaged in spite of the unfavorable weather for grasshopper development during April, May, and June.

In addition to grasshopper-control work, the entomology project, through the county agents and their local leaders, assisted Missouri farm people in protecting their crops against the army worm, chinch bugs, and cotton-leaf worm; their livestock from bots and screwworms; their orchards from codling-moth and oriental fruit moth damage; and their gardens against the Mexican bean beetle, aphids, cabbage and potato insects, and several other pests. Through the home demonstration agents, such household insects as roaches, ants, flies, silverfish, and clothes moths received attention. All these pests received wide attention in those counties in which the problems demanded such.

4-H entomology clubs were started in 1938 for the first full year's work. There were 39 clubs organized with 863 members enrolled. The members have collected many insects and from all indications like the work immensely. Several of the leaders asked for a second-year project and stated that their group got so much value and pleasure from the first year's work they wanted to study certain groups more in detail. Some agents said that there might have been more leaders to begin the work if they had not felt they lacked knowledge of the subject matter. Results of the work this year show that this idea is of minor importance, and the leaders should be encouraged to disregard the idea that they are not competent to carry on the work.

In order to carry on insect control work, local conditions must be known, that proper planning may be done. The county agents and leaders in the various communities were relied upon for considerable information. The training of leaders and the work done by 4-H Club members were two important phases of the project for 1938. The value of such training is difficult to measure, but it undoubtedly will have a long-time effect.

--Annual Report, 1938, Missouri
Extension Entomologist.

Educational Work With Insecticide Dealers

Educational work with insecticide dealers was introduced this year and has already proved worth while. A need was felt for insecticide dealers in the State to become better acquainted with the principles of insect control, the action of different poisons on insects, and the recommendations of the Extension Service for insect and disease control. Certain insecticide manufacturers have cooperated in providing lists of their distributors in Delaware and the approximate volume of annual sales. The dealers in the State were contacted by the assistant specialist, who provided them with a statement covering the principles of insect control and a summary of control measures for garden insects. An effort was made to arrange dealer meetings in each county for a consideration of control problems. At such a meeting in Sussex County, with 10 dealers present, standard products and approved measures for insect control were discussed.

At the annual meeting of the Delaware Pharmaceutical Society, the assistant extension specialist spoke on the general subject of insect control and the role of the druggist in the sale of insecticides.

A mimeographed statement entitled "Information for Insecticide Dealers" was prepared and distributed to 133 dealers and druggists in the State. From time to time additional information on the Japanese beetle, household insects, black widow (spider), and the use of red squill in rat control has been provided.

Results. - This project has received favorable comment, and the work will be expanded during 1939.

--Annual Report, 1938, Delaware
Extension Entomologist.

Tarnished Plant Bug

There was a general occurrence of the tarnished plant bug on field celery in Lancaster County this year. One field of celery was observed that had received two applications of a proprietary spray material. Another field was observed that had received two applications of a 3/4 of 1 percent rotenone dust. In both these fields large numbers of immature plant bugs could be found.

Sulphur-lime dusts or sprays continued to give good results and were economical. It appeared that sulphur was an excellent repellent to the adult bugs, and celery growers who followed these recommendations had no difficulty in keeping the plants free from injury during the hot summer days when the plant bug was prevalent.

--Annual Report, 1937, Pennsylvania
Extension Entomologist.

Control of Insects Attacking Greenhouse Plants

The outstanding accomplishment in this line of investigation has been the adoption of an efficient steam hot-water heater developed by Mr. C. C. Compton, entomologist of Illinois. Following the development of this steam hot-water heater in 1936, the operation of the heater was demonstrated at florists' meetings at Urbana, Peoria, West Chicago, Aptakisic, and Cicero, Ill., during 1937. Treatment of greenhouse soils with hot water is for the purpose of controlling soil pests and at the same time leaching out excess salts accumulating in the soil. As a result of the hot-water treatment, yields from such crops as sweet peas, snapdragons, and roses have shown production increases of 20 to 50 percent. In addition, the quality of flowers was better than from plants grown in untreated or new soil. The cost of the hot-water treatment is approximately one-half the cost of the old practice of changing soil every 1 to 5 years. Over 100 of these heaters are now in operation in Illinois greenhouses.

--Annual Report, 1937, Illinois
Extension Entomologist.

Fly Traps by the Dozens

During the spring, a roll of 24-inch screen wire and a sack of finishing nails were taken to each meeting held. While the women were gathering, those who were interested made fly traps. Nineteen fly traps were made in Ashley in Uintah County. The leader held another meeting later, making fly traps so that each family that was interested could have one to use. The adult leader in Moab reported showing 20 families how to make fly traps.

Twenty-two demonstrations were given in these counties, and 136 traps made. Incidentally, at each demonstration there was a good opportunity for discussion of fly-control methods.

--Annual Report, 1937, Utah Home Demonstration Agent, (At large).

TIMELY TOPICS

Undisturbed Tobacco Fields Provide Favorable Overwintering Quarters for Flea Beetles

Intensive studies on the hibernation of the tobacco flea beetle (Epitrix parvula (F.)) by Clemence Levin, of the Oxford, N. C., B.A.E. laboratory, disclosed that last winter the greatest number of adult flea beetles were found in dead grass near old tree stumps in an undisturbed tobacco field. As many as 110 flea beetles were taken from a single square-foot sample in this environment late in March. The hibernation studies indicated further that the flea beetles were apparently well distributed over the wooded area where tobacco-plant beds were located, and that tobacco stalks of the 1938 crop, characterized by the presence of debris from suckers appeared to harbor more flea beetles than stalks that were not accompanied by such debris.

Spraying Wild Fruits

Spraying the wild fruits and berries on which game animals and songbirds feed, just as orchards and cottonfields are sprayed to keep down insect pests and destructive fungi, is proposed by Floyd B. Chapman of the Ohio Division of Conservation, in a communication to the Journal of Wildlife Management. Test sprayings of two species of wild grape affected by the grape berry moth resulted in fivefold increases in yield of ripe fruit, Mr. Chapman reported. Spraying wild fruits has the further indirect benefit of abating their role as lurking-places of insects and fungi that may spread to neighboring farms and orchards. (Science Service.)

Citrus Tree Duster

"The latest duster for treating citrus trees for the red-spider blight is of a type to make use of recently developed toxic materials which require that all surfaces of the foliage and fruits of a tree be thoroughly dusted," says Business Week (April 2). "The duster, built by agricultural engineers of the University of California, consists of large fans operating at 1,200 r.p.m. These discharge 7,000 cubic feet of air a minute through fishtail nozzles at a velocity of 65 miles an hour. Farm equipment manufacturers are keeping a watchful eye on this product of a university's research; citrus growers see an end to a troublesome problem."

Home-Made Pyrethrum Livestock Spray

Craig Eagleson, of the Dallas, Tex., Bureau of Entomology and Plant Quarantine laboratory, reports that a home-made pyrethrum livestock spray containing 100 milligrams pyrethrins per 100 cc. can be prepared by using 20-to-1 commercial concentrated pyrethrum extract diluted with high-grade kerosene at a cost of 34 cents a gallon. This spray is fully as toxic to flies attacking livestock as commercial pyrethrum sprays of the same pyrethrin content, which cost approximately twice the amount.

Control of Cattle Grubs

R. W. Wells, Extension entomologist, reports the results of a series of tests on the use of derris and cube washes on the backs of cattle for control of cattle grubs in Colorado and Iowa.

"Using derris and cube washes (16,12,8, and 4 ounces, and 4 ounces of soap per gallon of warm water) on the backs of cattle, it was found that 1 quart is sufficient to treat only 3 animals with such winter coats as are found in Colorado and Iowa. After distributing the powdery wash over the back, it was found essential to devote 2 man-minutes of rubbing the wash into the hair with the hands. Rubbing with a brush is less efficient. Twelve ounces of the powder per gallon of wash is as efficient as 16 ounces with an equal amount of rubbing. Eight ounces of powder per gallon with the 2 man-minutes of hand rubbing was survived by approximately 9 percent of the grubs, whereas with 16 ounces per gallon the best result was a survival of 3.15 percent. The powders were reported by the Division of Insecticide Investigations to contain rotenone and extractives as follows: Derris, 5.2 percent rotenone and 15.5 percent total extractives; cube, 4.7 percent rotenone, and 21.1 percent total extractives. In all, 186 cattle were used, each being handled twice, first for application of the wash and secondly for extraction of the grubs totaling 4,709."

Poison Bait by Plane

The Farmer (St. Paul, August 12) contains an article on Spreading "hopper" bait by plane. The author, W. H. Kircher, says in part: "The two questions most often asked about plane spreading of hopper bait are: (1) Is it efficient in killing the hoppers, and (2) how much does it cost? The first question we can answer from observation. Plane spreading is efficient so far as the kill is concerned. We were in buckbrush and sweet-clover brakes where the growth was up to our chins. A group of us walked in, parting the growth at random and counting hoppers on the ground. At one spot where it appeared that there were no more than an average number of dead hoppers we parted the growth, laid a piece of paper measuring 9 by 5 inches on the ground, marked around it, and then counted hoppers in that area. There were 15 dead hoppers under the paper. That would be 532 per square yard. It costs 8 cents per acre to spread bait by plane. That figure is based on 20 pounds per acre, and covers cost of transporting bait from the mixing station to the area landing field, putting it in the plane,

and spreading it. Whether plane spreading will become more common depends on appropriations for the spreading of idle lands, and also on whether or not farmers in large areas are convinced that they can hire spreading done by plane cheaper than they can spread the bait themselves."

An Effective Bait for Mormon Crickets

F. T. Cowan, Bureau of Entomology and Plant Quarantine, Bozeman, Mont., reports: "After 4 years of intensive work, an efficient and economical bait has been developed for adult and late-instar Mormon crickets. It consists of 100 pounds of standard wheat bran, 4 pounds of sodium fluosilicate, and from 12 to 15 gallons of water. This bait was thoroughly tested on small plots in the field over 15 replications and gave an average kill of 86.3 percent. It was also tested under actual farm conditions on plots of from 5 to 18 acres and gave estimated kills of 75 to 95 percent in every instance where temperature and weather conditions were favorable for feeding. The tests on the small plots also showed that the addition of 2 gallons of cane molasses to the basic bran-sodium fluosilicate-water bait gave only slightly higher kills; therefore, molasses is not recommended because of the additional cost. Two pounds of sodium fluosilicate per 100 pounds of bran gave significantly poorer kills than 4 pounds, whereas sodium arsenite showed a definite repellent effect, even when used at the rate of ½ pint per 100 pounds of bran. Through a series of tests using the old "pan-bait method" extending over some 28 days, it was determined that the greatest numbers of Mormon crickets feed between the hours of 7 and 10 a. m., and at temperatures ranging from 65° to 95° F., with the optimum at 86°."

Worm-Free Sweet Corn

"During the past 5 years, results at the Kentucky Experiment Station showed that clipping the silks and end of the corn husk beyond the cob, just after pollination, was a promising method for control of the earworm," says E. M. Emmert, University of Kentucky, in Country Gentleman (May). "The test was repeated on a larger scale last year and the results substantiate the earlier findings. They indicate that clipping 4 to 6 days after pollination is complete, as evidenced by browning of the silks, is a method by which the percentage of wormy ears can be materially reduced even when the population of worms is high. Of 740 ears clipped 4 to 6 days after pollination, 85 percent were free of worms, while of 350 unclipped ears, only 24.5 percent were worm free. Earlier or later clippings were not so effective. The worms and eggs in the clipped ears should be collected and destroyed by burying below 6 inches, drowning in water, burning, or treating with a strong chemical."

Loss of Insecticides Applied as Dusts

A study conducted by S. F. Potts, New Haven, Bureau of Entomology and Plant Quarantine, of the action of dust particles falling on or moving over plant leaves and needles of different physical structure, showed that in growth of medium density only from 10 to 26 percent of the dust applied

actually settled on the foliage, as compared with a deposit of from 38 to 60 percent in ordinary spray mixtures. Furthermore, under average conditions, air movement after dust application removed approximately 50 percent of the initial deposit. The loss by wind was greatest at the tops of the trees. In the 11 different insecticides investigated in dust form, from 2 to 26 percent (averaging 15 percent) of the initial deposit remained after 1 inch of rain. Although materials which greatly increased their initial deposit and adherence were added to these dusts, the investigations showed that more efficient methods of application are needed than those now in general use.

Beeswax for Boxes

"A new market for beeswax has been opened up by a paper company in Kansas, with its development of a new waterproof cardboard box having corrugations of asphalt and an inside coating of wax," says the American Bee Journal (May). "Large quantities of beeswax are being used on thousands of cartons for use in shipping flowers, certain types of meats, celery, and other products. This type of wax can be applied very evenly; it has exceptional waterproofing qualities, and it does not rub or scrape off easily ....."

Another Analog of Paris Green Patented

On August 16, 1938, F. E. Dearborn, Bureau of Entomology and Plant Quarantine, was granted U. S. Patent 2,127,380, which covers the use as an insecticide of compounds of copper, arsenic, and unsaturated acids. These compounds are analogous to paris green, and are believed to be equally as toxic to insects and at the same time less injurious to plant foliage.

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